

Plasmid Backbone

FIGURE 2A

FIGURE 2B

pDG2

GTTAACTACGTCAGGTGGCACTTTTCGGGGAAATGTGCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATA TGTATCCGCTCATGAGACAATAACCCTGATAAATGCTTCAATAATATTGAAAAAGGAAGAGTATGAGTATTCAACATTTC CGTGTCGCCCTTATTCCCTTTTTTGCGGCATTTTGCCTTCCTGTTTTTGCTCACCCAGAAACGCTGGTGAAAGTAAAAGA TGCTGAAGATCAGTTGGGTGCACGAGTGGGTTACATCGAACTGGATCTCAACAGCGGTAAGATCCTTGAGAGTTTTCGCC CCGAAGAACGTTCTCCAATGATGAGCACTTTTAAAGTTCTGCTATGTGGCGCGGTATTATCCCGTGTTGACGCCGGGCAA GAGCAACTCGGTCGCCGCATACACTATTCTCAGAATGACTTGGTTGAGTACTCACCAGTCACAGAAAAGCATCTTACGGA TCGGAGGACCGAAGGAGCTAACCGCTTTTTTGCACAACATGGGGGATCATGTAACTCGCCTTGATCGTTGGGAACCGGAG CTGAATGAAGCCATACCAAACGACGAGGGTGACACCACGATGCCTGTAGCAATGGCAACAACGTTGCGCAAACTATTAAC GCTCGGCCCTTCCGGCTGGCTGGTTTATTGCTGATAAATCTGGAGCCGGTGAGCGTGGGTCTCGCGGTATCATTGCAGCA CTGGGGCCAGATGGTAAGCCCTCCCGTATCGTAGTTATCTACACGACGGGGAGTCAGGCAACTATGGATGAACGAAATAG ${\tt ACAGATCGCTGAGATAGGTGCCTCACTGATTAAGCATTGGTAACTGTCAGACCAAGTTTACTCATATATACTTTAGATTG}$ ATTTACCCCGGTTGATAATCAGAAAAGCCCCCAAAAACAGGAAGATTGTATAAGCAAATATTTAAATTGTAAACGTTAATA TTTTGTTAAAATTCGCGTTAAATTTTTGTTAAATCAGCTCATTTTTTAACCAATAGGCCGAAATCGGCAAAATCCCTTAT AAATCAAAAGAATAGCCCGAGATAGGGTTGAGTGTTGTTCCAGTTTGGAACAAGAGTCCACTATTAAAGAACGTGGACTC ${\tt CAACGTCAAAGGGCGAAAAACCGTCTATCAGGGCGATGGCCCACTACGTGAACCATCACCCAAATCAAGTTTTTTGGGGT}$ CGAGGTGCCGTAAAGCACTAAATCGGAACCCTAAAGGGAGCCCCCGATTTAGAGCTTGACGGGGAAAGCGAACGTGGCGA GAAAGGAAGGAAGAAAGCGAAAAGGAGCGGGGCGCTAGGGCGCTGGCAAGTGTAGCGGTCACGCTGCGCGTAACCACCACA CCCGCCGCGCTTAATGCGCCGCTACAGGGCGCGTAAAAGGATCTAGGTGAAGATCCTTTTTGATAATCTCATGACCAAAA TCCCTTAACGTGAGTTTTCGTTCCACTGAGCGTCAGACCCCGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTT TCTTTTTCCGAAGGTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTTCTTCTAGTGTAGCCGTAGTTAGGCCACC ACTTCAAGAACTCTGTAGCACCGCCTACATACCTCGCTCTGCTAATCCTGTTACCAGTGGCTGCCAGTGGCGATAAG TCGTGTCTTACCGGGTTGGACTCAAGACGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCAC ACAGCCCAGCTTGGAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGCGCCACGCTTCCCG AAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCAGGGTCGGAACAGGAGAGCGCACGAGGGAGCTTCCAGGGGGAAAC ${\tt GAGCCTATGGAAAAACGCCAGCAACGCGGCCTTTTACGGTTCCTGGCCTTTTGCTGGCCTTTTGCTCACATGTAATGTG}$ ACAATTTCACACAGGAAACAGCTATGACCATGATTACGCCAAGCTACGTAATACGACTCACTAGGCGGCCGCGTTTAAAC AATGTGCTCCTCTTTGGCTTGCTTCCGCGGGCCAAGCCAGACAAGAACCAGTTGACGTCAAGCTTCCCGGGACGCGTGCT $\tt AGCGGCGCGGAATTCCTGCAGGATTCGAGGGCCCCTGCAGGTCAATTCTACCGGGTAGGGGAGGCGCTTTTCCCAAGG$ ${\tt TCCACCGGTAGCGGCCACCGTTCTTTGGTGGCCCCTTCGCGCCACCTTCTACTCCTCCCCTAGTCAGGAAGTTC}$ CCCCCCGCCCCGCAGCTCGCGTCGTGCAGGACGTGACAAATGGAAGTAGCACGTCTCACTAGTCTCGTGCAGATGGACAG ${\tt CACCGCTGAGCAATGGAAGCGGGTAGGCCTTTGGGGCAGCGGCCAATAGCAGCTTTGCTCCTTCGCTTTCTGGGCTCAGA}$ GGCATTCTCGCACGCTTCAAAAGCGCACGTCTGCCGCGCTGTTCTCCTCTTCCTCATCTCCGGGCCTTTCGACCTGCAGC ACTGGGCACAACAGACAATCGGCTGCTCTGATGCCGCCGTGTTCCGGCTGTCAGCGCAGGGGGCGCCCGGTTCTTTTTGTC ${\tt TTGCGCAGCTGTGCTCGACGTTGTCACTGAAGCGGGAAGGGACTGGCTGCTATTGGGCGAAGTGCCGGGGCAGGATCTCCC}$ TGTCATCTCACCTTGCTCCTGCCGAGAAAGTATCCATCATGGCTGATGCAATGCGGCGGCTGCATACGCTTGATCCGGCT TGATCTGGACGAAGAGCATCAGGGGCTCGCGCCAGCCGAACTGTTCGCCAGGCTCAAGGCGCGCATGCCCGACGGCGATG ATCTCGTCGTGACCCATGGCGATGCCTGCTTGCCGAATATCATGGTGGAAAATGGCCGCTTTTCTGGATTCATCGACTGT GGCCGGCTGGGTGTGGCGGACCGCTATCAGGACATAGCGTTGGCTACCCGTGATATTGCTGAAGAGCTTGGCGGCGAATG GGCTGACCGCTTCCTCGTGCTTTACGGTATCGCCGCTCCCGATTCGCAGCGCATCGCCTTCTATCGCCTTCTTGACGAGT TCTTCTGAGGGGATCGATCCGTCCTGTAAGTCTGCAGAAATTGATGATCTATTAAACAATAAAGATGTCCACTAAAATGG AAGTTTTTCCTGTCATACTTTGTTAAGAAGGGTGAGAACAGAGTACCTACATTTTGAATGGAAGGATTGGAGCTACGGGG GTGGGGGTGGGGTGGGATTAGATAAATGCCTGCTCTTTACTGAAGGCTCTTTACTATTGCTTTATGATAATGTTTCATAG TTGGATATCATAATTTAAACAAGCAAAACCAAATTAAGGGCCAGCTCATTCCTCCCACTCATGATCTATAGATCTATAGA TCTCTCGTGGGATCATTGTTTTTCTCTTGATTCCCACTTTGTGGTTCTAAGTACTGTGGTTTCCAAATGTGTCAGTTTCA TAGCCTGAAGAACGAGATCAGCAGCCTCTGTTCCACATACACTTCATTCTCAGTATTGTTTTGCCAAGTTCTAATTCCAT CAGAAGCTGACTCTAGATCTGGATCCGGCCAGCTAGGCCGTCGACCTCGAGTGATCAGGTACCAAGGTCCTCGCTCTGTG TATTACGGACTGGCCGTCGTTTTACAACGTCGTGACTGGGGAAAACCCTGGCGTTACCCAACTTAATCGCCTTGCAGCACA TCCCCCTTTCGCCAGCTGGCGTAATAGCGAAGAGGCCCGCACCGATCGCCCTTCCCAACAGTTGCGCAGCCTGAATGGCG

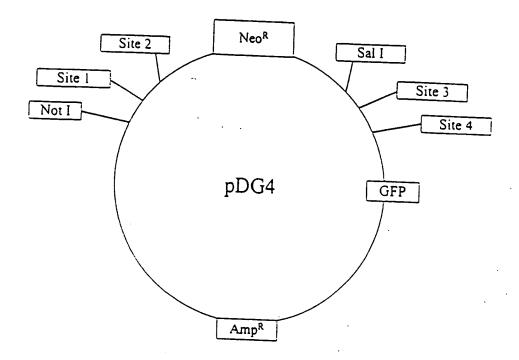


FIGURE 3A

FIGURE 3B

pDG4:

GTTTAATAGTAATCAATTACGGGGTCATTAGTTCATAGCCCATATATGGAGTTCCGCGTTACATAACTTACGGTAAATGG CCCGCCTGGCTGACCGCCCAACGACCCCCGGCCCATTGACGTCAATAATGACGTATGTTCCCATAGTAACGCCAATAGGGGA CTTTCCAATGACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGT ACGCCCCCTATTGACGTCAATGACGGAAAATGGCCCGCCTGGCATTAAGCCCCAGTACATGACCTTATGGGACTTTCCTAC TTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTGATGCGGTTTTTGGCAGTACATCAATGGGCGTGGATAGC TTTCCAAAATGTCGTAACAACTCCGCCCCATTGACGCAAATGGGCGGTAGGCGTGTACGGTGGGAGGTCTATATAAGCAG AGCTGGTTTAGTGAACCGTCAGATCCGCTAGCGCTACCGGTCGCCACCATGGTGAGCAAGGGCGAGGAGCTGTTCACCGG GGTGGTGCCCATCCTGGTCGAGCTGGACGGCGACGTAAACGGCCACAAGTTCAGCGTGTCCGGCGAGGGCGAGGGCGATG CCACCTACGGCAAGCTGACCCTGAAGTTCATCTGCACCACCGGCAAGCTGCCCGTGCCCTGGCCCACCCTCGTGACCACC CTGACCTACGGCGTGCAGTGCTTCAGCCGCTACCCCGACCACATGAAGCAGCACGACTTCTTCAAGTCCGGCCATGCCCGA AGGCTACGTCCAGGAGCGCACCATCTTCTTCAAGGACGACGACCAACTACAAGACCCGCGCCGAGGTGAAGTTCGAGGGG ACACCCTGGTGAACCGCATCGAGCTGAAGGGCATCGACTTCAAGGAGGACGGCCAACATCCTGGGGCACAAGCTGGAGTAC AACTACAACAGCCACAACGTCTATATCATGGCCGACAAGCAGAAGAACGGCATCAAGGTGAACTTCAAGATCCGCCACAA CATCGAGGACGGCAGCGTGCAGCCACCACCACCAGCAGAACACCCCCATCGGCGACGGCCCCGTGCTGCTGCCCG ACAACCACTACCTGAGGACCCAGTCCGCCCTGAGCAAAGACCCCCAACGAGAAGCGCGATCACATGGTCCTGCTGGAGTTC GTGACCGCCGCCGGGATCACTCTCGGCATGGACGAGCTGTACAAGTCCGGACTCAGATCCACCGGATCTAGATAACTGAT CATAATCAGCCATACCACATTTGTAGAGGTTTTACTTGCTTTAAAAAACCTCCCCACACCTCCCCCTGAACCTGAAACATA AAATGAATGCAATTGTTGTTTAACTTGTTTATTGCAGCTTATAATGGTTACAAATAAAGCAATAGCATCACAAATTTC ACAAATAAAGCATTTTTTTCACTGCATTCTAGTTGTGGTTTGTCCAAACTCATCAATGTATCTTAACGCGAACTACGTCA GGTGGCACTTTTCGGGGGAAATGTGCGCGGAACCCCTATTTGTTTATTTTTCTAAATACATTCAAATATGTATCCGCTCAT GAGACAATAACCCTGATAAATGCTTCAATAATATTGAAAAAGGAAGAGTATGAGTATTCAACATTTCCGTGTCGCCCTTA TTCCCTTTTTTGCGGCATTTTGCCTTCCTGTTTTTGCTCACCCAGAAACGCTGGTGAAAGTAAAAGATGCTGAAGATCAG TTGGGTGCACGAGTGGGTTACATCGAACTGGATCTCAACAGCGGTAAGATCCTTGAGAGTTTTCGCCCCGAAGAACGTTC TCCAATGATGAGCACTTTTAAAGTTCTGCTATGTGGCGCGGTATTATCCCGTGTTGACGCCGGGCAAGAGCAACTCGGTC GCCGCATACACTATTCTCAGAATGACTTGGTTGAGTACTCACCAGTCACAGAAAAGCATCTTACGGATGGCATGACAGTA TACCAAACGACGAGCGTGACACCACGATGCCTGTAGCAATGGCAACAACGTTGCGCAAACTATTAACTGGCGAACTACTT ACTCTAGCTTCCCGGCAACAATTAATAGACTGGATGGAGGCGGATAAAGTTGCAGGACCACTTCTGCGCTCGGCCCTTCC GGCTGGCTGGTTTATTGCTGATÄAATCTGGAGCCGGTGAGCGTGGGTCTCGCGGTATCATTGCAGCACTGGGGCCAGATG ·GTAAGCCCTCCCGTATCGTAGTTATCTACACGACGGGGAGTCAGGCAACTATGGATGAACGAAATAGACAGATCGCTGAG GATAATCAGAAAAGCCCCAAAAAACAGGAAGATTGTATAAGCAAATATTTAAATTTGTAAACGTTAATAATTTGTTAAAATT CGCGTTAAATTTTTGTTAAATCAGCTCATTTTTTAACCAATAGGCCGAAATCGGCAAAATCCCTTATAAATCAAAAGAAT AGCCCGAGATAGGGTTGAGTGTTCCAGTTTGGAACAAGAGTCCACTATTAAAGAACGTGGACTCCAACGTCAAAGGGCGAAAAACCGTCTATCAGGGCGATGGCCCACTACGTGAACCATCACCCAAATCAAGTTTTTTTGGGGTCGAGGTGCCGTAA AGCACTAAATCGGAACCCTAAAGGGAGCCCCCGATTTAGAGCTTGACGGGGAAAGCGAACGTGGCGAGAAAGGGAAGGGAA ATGCGCCGCTACAGGGCGCGTAAAAGGATCTAGGTGAAGATCCTTTTTGATAATCTCATGACCAAAATCCCTTAACGTGA GTAACTGGCTTCAGCAGAGCGCAGATACCAAATACTGTTCTTCTAGTGTAGCCGTAGTTAGGCCACCACCTCAAGAACTC TGTAGCACCGCCTACATACCTCGCTCTGCTAATCCTGTTACCAGTGGCTGCTGCCAGTGGCGATAAGTCGTGTCTTACCG GGTTGGACTCAAGACGATAGTTACCGGATAAGGCGCAGCGGTCGGGCTGAACGGGGGGTTCGTGCACACAGCCCAGCTTG GAGCGAACGACCTACACCGAACTGAGATACCTACAGCGTGAGCTATGAGAAAGCGCCACGCTTCCCGAAGGGAGAAAGGC GGACAGGTATCCGGTAAGCGGCAGGGTCGGAACAGGAGAGCGCACGAGGGAGCTTCCAGGGGGAAACGCCTGGTATCTTT ATTAGGCACCCCAGGCTTTACACTTTATGCTTCCGGCTCGTATGTTGTGTGGAATTGTGAGCGGATAACAATTTCACACA GGAAACAGCTATGACCATGATTACGCCAAGCTACGTAATACGACTCACTAGGCGGCCGCGTTTAAACAATGTGCTCCTCT ATTCCTGCAGGATTCGAGGCCCCTGCAGGTCAATTCTACCGGGTAGGGGAGGCGCTTTTCCCCAAGGCAGTCTGGAGCAT GCGCTTTAGCAGCCCCGCTGGCACTTGGCGCTACACAAGTGGCCTCTGGCCTCGCACACATTCCACATCCACCGGTAGCG CCAACCGGCTCCGTTCTTTGGTGGCCCCTTCGCGCCACCTTCTACTCCTCCCCTAGTCAGGAAGTTCCCCCCCGCCCCGC AGCTCGCGTCGTGCAGGACGTGACAAATGGAAGTAGCACGTCTCACTAGTCTCGTGCAGATGGACAGCACCGCTGAGCAA GCTTCAAAAGCGCACGTCTGCCGCGCTGTTCTCCTCTTCCTCATCTCGGGCCTTTCGACCTGCAGCCAATATGGGATCG GCCATTGAACAAGATGGATTGCACGCAGGTTCTCCGGGCGCTTGGGTGGAGAGGGCTATTGGGCTATGACTGGGCACAACA CTCGACGTTGTCACTGAAGCGGGAAGGGACTGGCTGCTATTGGGCGAAGTGCCGGGGCAGGATCTCCTGTCATCTCACCT

TGCTCCTGCCGAGAAAGTATCCATCATGGCTGATGCAATGCGGCGGCTGCATACGCTTGATCCGGCTACCTGCCCATTCG ACCACCAAGCGAAACATCGCATCGAGCGAGCACGTACTCGGATGGAAGCCCGTCTTGTCGATCAGGATGATCTGGACGAA GAGCATCAGGGGCTCGCGCCAGCCGAACTGTTCGCCAGGCTCAAGGCGCGCATGCCCGACGGCGATGATCTCGTCGTGAC CCATGGCGATGCCTGCTTGCCGAATATCATGGTGGAAAATGGCCGCTTTTCTGGATTCATCGACTGTGGCCGGCTGGGTG TGGCGGACCGCTATCAGGACATAGCGTTGGCTACCCGTGATATTGCTGAAGAGCTTGGCGGCGAATGGGCTGACCGCTTC CTCGTGCTTTACGGTATCGCCGCTCCCGATTCGCAGCGCATCGCCTTCTATCGCCTTCTTGACGAGTTCTTCTGAGGGGA TCGATCCGTCCTGTAAGTCTGCAGAAATTGATGATCTATTAAACAATAAAGATGTCCACTAAAATGGAAGTTTTTCCTGT GGGATTAGATAAATGCCTGCTCTTTACTGAAGGCTCTTTACTATTGCTTTATGATAATGTTTCATAGTTGGATATCATAA TTTAAACAAGCAAAACCAAATTAAGGGCCAGCTCATTCCTCCCACTCATGATCTATAGATCTATAGATCTCTCGTGGGAT CATTGTTTTTCTCTTGATTCCCACTTTGTGGTTCTAAGTACTGTGGTTTCCAAATGTGTCAGTTTCATAGCCTGAAGAAC GAGATCAGCAGCCTCTGTTCCACATACACTTCATTCTCAGTATTGTTTTGCCAAGTTCTAATTCCATCAGAAGCTGACTC ACGACACAGGACACGCAAATTAATTAAGGCCGGCCCGTACCCTCTAGTCAAGGCCTTAAGTGAGTCGTATTACGGACTGG AGCTGGCGTAATAGCGAAGAGGCCCGCACCGATCGCCCTTCCCAACAGTTGCGCAGCCTGAATGGCGAATGGCGCTTCGC TTGGTAATAAAGCCCGCTTCGGCGGGCTTTTTTTT

FIGURE 3B (Continuted)

Annealing site		Sequence	Sequence after digestion
1	3.	tgtgctcctctttggcttgcttccaa 3' acacgaggagaaaccgaacgaaggtt 5'	5' tgtgctcctctttggcttgcttccaa 3' 3'
2	5! 3!	ctggttcttgtctggcttggcccaa 3' gaccaagaacagaccgaaccgggtt 5'	5' ctggttcttgtctggcttggcccaa3' 3' tt5'
. 3	31	ggtcctcgctctgtgtccgttgaa 3' ccaggagcgagacacaggcaactt 5'	5' ggtcctcgctctgtgtccgttgaa3' 3' tt5'
4	3.	tttgcgtgtcctgtgtcgtcgaa 3' aaacgcacaggacacagcagctt 5'	5' tttgcgtgtcctgtgtcgtcgaa3' 3' tt5'

FIGURE 4

Annealing	<u></u>	Sequence			Sequence after digestion	
site			-			
	. 5	AAtgtgctcctcttggcttgcttCCGC 3'		5' AA	AA	3.
	٠ ٣	Ttacacgaggagaaaccgaacgaagg	5.	- ~	Tracacgaggagaaccgaacgaagg	5
^	-2	AActggttcttgtctggcttggCCCGC	3 5	1.5	AA	- 6
1	<u>-</u> ۳	Trgaccaagaacagaccgaaccggg	5 3	· ~	Trgaccaagaacagaccgaaccggg	-
۳	ŝ	AAggtectegetetgtgteegttGAGCT	3, 5		AA	3.6
ו	3,	Trccaggagcgagacacaggcaac	5.	-	Ttccaggagcgagacacaggcaac	
4	5 -	AAtttgcgtgtcctgtgtcgtcGAGCT	3 , 5	-	AA	-
•	3,	Ttaaacgcacaggacacagcagc	51 .3	-	Ttaaacgcacaggacacagcagc	

FIGURE 5

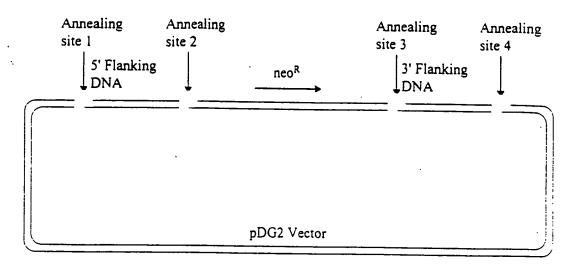
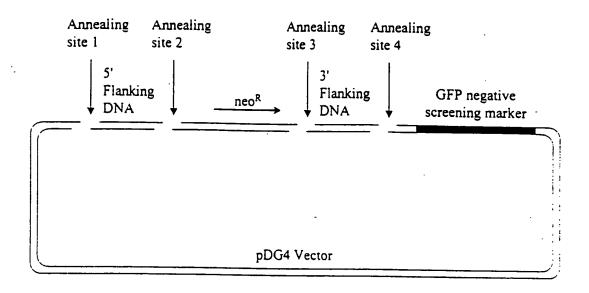
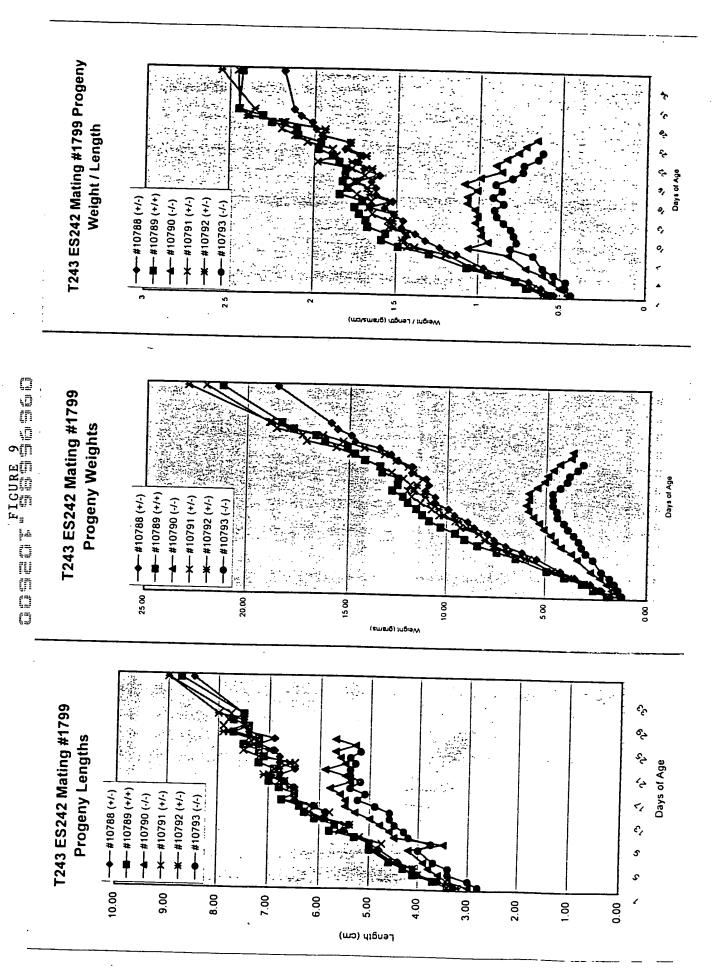


FIGURE 7



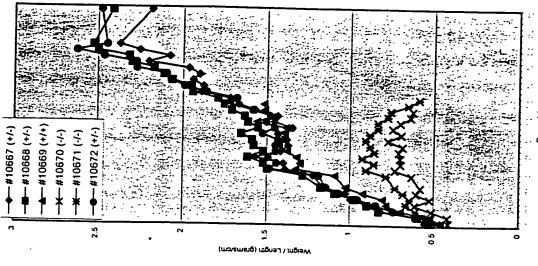
Oligo #	Sequence (5' to 3')
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180	ATAGGCATAGTAGGCCAGCTTGAGG
454	tgtgctcctctttggcttgcttccAATTAACCCTCACTAAAGGGAACGAAT
463	ctggttcttgtctggcttggcccaaTGCAACAGGTTTCCTGAGCGGTCAT
464	ggtcctcgctctgtgtccgttgaaCCTCAAGCTGGCCTACTATGCCTAT
42	tttgcgtgtcctgtgtcgtcgaaCGACTAATACGACTCACTATAGGGCG
151	GCCAATGGACTCTTAGTTTTGGAAC
155	GTTCTGGCAAACAAATTCGGCGCAC
454	tgtgctcctctttggcttgcttccAATTAACCCTCACTAAAGGGAACGAAT
465	ctggttcttgtctggcttggcccaaGTTCCAAAACTAAGAGTCCATTGGC
466	ggtcctcgctctgtgtccgttgaaGTGCGCCGAATTTGTTTGCCAGAAC
1 2	GAACCTTGGTGTGCCAAGTTACTTC GAACTTTGGCTGAACCCCTTGTTCT
41	tgtgctcctctttggcttgcgttgaaCGACTAATACGACTCACTATAGGGCG
38	ctggttcttgtctggcttggccaaGAAGTAACTTGGCACACCAAGGTTC
40	ggtcctcgctctgtgtccgttgaAGAACAAGGGGTTCAGCCAAAGTTC tttgcgtgtcctgtgtcgtcgAATTAACCCTCACTAAAGGGAACGAAT
540	ATGCCGGATCTCCTACTACTGGGCC
546	TGTCATAGTAGACAGCGATGGAACG
445	GACAAGAACCAGTTGACGTCAAGCTTCCCGGGACGCGTGCTAGCGGCGCGCCG
667	ctggttcttgtctggcttggccaaGGCCCAGTAGTAGGAGATCCGGCAT
	ggtcctcgctctgtgtccgttgaaCGTTCCATCGCTGTCTACTATGACA
907	ctggttcttgtctggcttggcccaaAAAGCCGACAGCCACGCTCACAAGC ggtcctcgctctgtgtccgttgaaGCCCAATGCCACAGAGAGAGAATGT
1157	ctggttcttgtctggcttggcccaaGTTGGATCCTCTCCAAGGCCCCATCT



(ಆರ)

COSSETT CARE TO SECT

T243 ES242 Mating #1808 Progeny Weight / Length



Mouse cDNA

GCTAGGCCCGAGTCCCGCCGGGGCTGAGGAGACCGACTGGGTGCGATTGCCCAGCAAATGCGAAGTGTGC AAGTATGTTGCTGTGGAGCTGAAGTCGGCTTTTGAGGAAACGGGAAAGACCAAGGAAGTGATTGACACCG GCTATGGCATCCTGGACGGGAAGGGCTCTGGAGTCAAGTACACCAAGTCGGACTTACGGTTAATTGAAGT CACTGAGACCATTTGCAAGAGGCTTCTGGACTACAGCCTGCACAAGGAGGAGGACTGGCAGCAACCGGTTT GCCAAGGGTATGTCGGAGACCTTTGAGACGCTGCACAACCTAGTCCACAAAGGGGTCAAGGTGGTGATGG ATATCCCCTATGAGCTGTGGAACGAGACCTCAGCAGAGGTGGCTGACCTCAAGAAGCAGTGTGACGTGCT CTCTGTGCCAACCACGTGCTGAAGGGAAAGGACACGAGTTGCCTAGCAGAGCGGTGGTCTGGCAAGAAGG GGGACATAGCCTCCCTGGGAGGGAAGAAATCCAAGAAGAAGCGCGGGGGGTCAAGGGCTCCTCCAGTGG CAGCAGCAAGCAGAGGAAGGAACTGGGGGGGGCCTGGGGGAGGATGCCAACGCCGAGGAGGAGGAGGATGTG CAGAAGGCATCGCCCCTCCCACACAGCCCCCCTGATGAGCTGTGAGCCCAGCTTAGTGTCCTTGAATCAA GACCCCTGACTTCAGAGCTTGGGACACGCACAGCGCAGCGCAGCTCCAGCAAGGACAGCTGCTGT CCAGCATCAGGTCTCCCTTGGCTGTGCCCCTTTCCTTCCCTTGAACAACAGCAAGAGGTGGAAGGAT CTGGGGTGCTGGGAGACGCCACCCCAAAGGGAAGAGGAGGAGGAGCAGAAGGCAGCTCTCTTTCTACACA GTCCCCTCACGAGCTCCGGGGTCCACCCAGCATCCCCAGGCTGAGATCCAGGCTCCTGACATGGAAGCT CAGCCAGGCCTGCCTCCTTCCACCAAGCATTCTCTTCTGCTGGTCCTTGTCGGATGGTAAATTCGAG AACTTCCAGGACAAACTCGGGTGTGGCACAAAGGGGCTGGACGCCAGAGCCAGAGCCACGCCAGAGACTG AGGACGCCTCATGCTCTGCCCAGCCCTTCTCCCAGGGCTACCAGAGTAAACACCTTTTGGCCTTTCGGTT TGGTTCCTGGGTCCTCATCAGCCTCCAGAGTGTCCCCTCATCGATCTTTTTTGCCTTTGTCCCCCAATCC CAGGGGCTGGAAGGCCATCACCATCATTGGAGGCTTAACCTGTCAGTTACTAGGAGGTGCTGGGAGCGCC CGGGGTTGGTTTGGGGTAATCACTCACTGGCTCTCAGCCTTCTAACACTGCAGCCCCTTAATACAGTTCC TTCTGTTGTGGTGACTCCCACGCCCCCACACACACACATAAAATTATTTCGATGCTGTTTCATAACTGT ΑΑΑΑΑΑΑΑΑΑΑΑΑΑΑΑΑΑ SEQ ID NO:47

Human cDNA

TGCTGCTGCCGGCCCCGGAGCTGGGCCCGAGCCAGGCCGGAGCTGAGGAGAACGACTGGGTTCGCCT GCCCAGCAAATGCGAAGTGTGTAAATATGTTGCTGTGGAGCTGAAGTCAGCCTTTGAGGAAACCGGCAAG ACCAAGGAGGTGATTGGCACGGGCTATGGCATCCTGGACCAGAAGGCCTCTGGAGTCAAATACACCAAGT CGGACTTGCGGTTAATCGAAGTCACTGAGACCATTTGCAAGAGGCTCCTGGATTATAGCCTGCACAAGGA GAGGACCGGCAGCAATCGATTTGCCAAGGGCATGTCAGAGACCTTTGAGACATTACACAACCTGGTACAC AAAGGGGTCAAGGTGGTGATGGACATCCCCTATGAGCTGTGGAACGAGACTTCTGCAGAGGTGGCTGACC TCAAGAAGCAGTGTGATGTGCTGGTGGAAGAGTTTGAGGAGGTGATCGAGGACTGGTACAGGAACCACCA GGAGGAAGACCTGACTGAATTCCTCTGCGCCAACCACGTGCTGAAGGGAAAAGACACCAGTTGCCTGGCA TGAGCCCACCCAGCATCCTCTGTCCTGAGACCCCTGATTTTGAAGCTGAGGAGTCAGGGGCATGGCTCTG GCAGGCCGGGATGGCCCCGCAGCCTTCAGCCCCTCCTTGCCTTGGCTGTGCCCTCTTCTGCCAAGGAAAG ACACAAGCCCCAGGAAGAACTCAGAGCCGTCATGGGTAGCCCACGCCGTCCTTTCCCCTCCCCAAGTGTT TCTCTCCTGACCCAGGGTTCAGGCAGGCCTTGTGGTTTCAGGACTGCAAGGACTCCAGTGTGAACTCAGG AGGGGCAGGTGTCAGAACTGGGCACCAGGACTGGAGCCCCCTCCGGAGACCAAACTCACCATCCCTCAGT CCTCCCCAACAGGGTACTAGGACTGCAGCCCCCTGTAGCTCCTCTCTGCTTACCCCTCCTGTGGACACCT

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AGCTCAGACATGGACTCCATGGCCC SEQ ID NO:45 TGCGATTGCCCAGCAAATGCGAAGT SEQ ID NO:46

Outward oligo 488 ctggttcttgtcggcttggcccaaAGCTCAGACATGGACTCCATGGCCC SEQ ID NO:48
Outward oligo 489 ggtcctcgctctgtgtccgttgaaTGCGATTGCCCAGCAAATGCGAAGT SEQ ID NO:49

primer 426 GGGCCATGGAGTCCATGTCTGAGCT SEQ ID NO:55
primer 432 ACTTCGCATTTGCTGGGCAATCGCA SEQ ID NO:56

5' of the deletion:

3' of the deletion:

5'



Deletion generated by knockout

5 ' GGCCCGAGTCCCGCCGGGGCTGAGGAGACCGACTGGG 3' (SEQ ID NO:59)

Expanded T243

GAAGTGTGCAAGTATGTTGCTGTGGAGCTGAAGTCGGCTTTTGAGGAAACGGGAAAGACCAAGGAAGTGA TTGACACCGGCTATGGCATCCTGGACGGGAAGGGCTCTGGAGTCAAGTACACCAAGTCGGACTTACGGTT AATTGAAGTCACTGAGACCATTTGCAAGAGGCTTCTGGACTACAGCCTGCACAAGGAGAGGACTGGCAGC **AACCGGTTTGCCAAGGGTATGTCGGAGACCTTTGAGACGCTGCACAACCTAGTCCACAAAGGGGTCAAGG** TGGTGATGGATATCCCCTATGAGCTGTGGAACGAGACCTCAGCAGAGGTGGCTGACCTCAAGAAGCAGTG TGACGTGCTGGTGGAAGAGTTTGAAGAGGTGATTGAGGACTGGTACAGGAACCACCAGGAGGAAGACCTG ACTGAATTCCTCTGTGCCAACCACGTGCTGAAGGGAAAGGACACGAGTTGCCTAGCAGAGCGGTGGTCTG GCAAGAAGGGGGACATAGCCTCCCTGGGAGGGAAGAAATCCAAGAAGAAGCGCAGCGGAGTCAAGGGCTC CTCCAGTGGCAGCAGCAGCAGGAAGGAACTGGGGGGGCCTGGGGGAGGATGCCAACGCCGAGGAGGAG GAGGGTGTGCAGAAGGCATCGCCCCTCCCACACAGCCCCCCTGATGAGCTGTGAGCCCAGCTTAGTGTCC TTGAATCAAGACCCCTGACTTCAGAGCTTGGGACACGCACAGCGCAGCGCAGCGCAGCTCCAGCAAGGAC TTCTACACAGTCCCCCTCACGAGCTCCGGGGTCCACCCAGCATCCCCAGGCTGAGATCCAGGCTCCTGAC CAGCCTCAGCAGCCAGGCCTGCCTCTTCCTTCCACCAAGCATTCTCTTCTGCTGGTCCTTGTCGGATGGT AAATTCGAGAACTTCCAGGACAAACTCGGGTGTGGCACAAAGGGGCTGGACGCCAGAGCCAGAGCCACGC CAGAGACTGCAGAGAGGGCACCTGACCTAACCCCCCTGGAAAGCCAATCTGCAGTTCCCGTGTCCACCCA CTCCTCCTGAGGACGCCTCATGCTCTGCCCAGCCCTTCTCCCAGGGCTACCAGAGTAAACACCTTTTGGC CTTTCGGTTTGGTTCCTGGGTCCTCATCAGCCTCCAGAGTGTCCCCTCATCGATCTTTTTTGCCTTTGTC CCCCAATCCCAGGGGCTGGAAGGCCATCACCATCATTGGAGGCTTAACCTGTCAGTTACTAGGAGGTGCT GGGAGCGCCCGGGGTTGGTTTGGGGTAATCACTCACTGGCTCTCAGCCTTCTAACACTGCAGCCCCTTAA CATAACTGTAAAAAAAAAAAAAAAAAA SEQ ID NO:53

EXPANDED T243

Amino Acid Sequence

KTKEVIDTGYGILDGKGSGVKYTKSDLRLIEVTETICKRLLDYSLHKERTGSNRFAKGMSETFETLHNLV HKGVKVVMDIPYELWNETSAEVADLKKQCDVLVEEFEEVIEDWYRNHQEEDLTEFLCANHVLKGKDTSCL **AERWSGKKGDIASLGGKKSKKKRSGVKGSSSGSSKQRKELGGLGEDANAEEEEGVQKASPLPHSPPDEL** SEQ ID NO:54